

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU03/01227

**A. CLASSIFICATION OF SUBJECT MATTER**Int. Cl. <sup>7</sup>: C12N 15/00, A01K 67/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

SEE ELECTRONIC DATABASES

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SEE ELECTRONIC DATABASES

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIDS, MedLine, CA: neuropeptide Y receptor, bone, agonist, antagonist, modulate, activate, inhibit, knockout

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/53477 A1 (BAYLOR COLLEGE OF MEDICINE) 26 July 2001 Pp 33-52, claims 43-60, SEQ IDs	1-74, 131-140 and 150
X	Baldock Paul A et al. Hypothalamic Y2 receptors regulate bone formation. J Clin Invest, (2002 Apr) 109 (7) 915-21. Whole document	1-74, 122-140 and 150.
X	Sainsbury Amanda al. Synergistic effects of Y2 and Y4 receptors on adiposity and bone mass revealed in double knockout mice. Mol Cell Biol, (2003 Aug) 23 (15) 5225-33. Whole document	1-104, 122-140 and 150

☒ Further documents are listed in the continuation of Box C☒ See patent family annex

- \* Special categories of cited documents:
- |   |  |
|---|--|
| "A" document defining the general state of the art which is not considered to be of particular relevance  | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  |
| "E" earlier application or patent but published on or after the international filing date   | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone   |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "O" document referring to an oral disclosure, use, exhibition or other means  | "&" document member of the same patent family  |
| "P" document published prior to the international filing date but later than the priority date claimed  |  |

Date of the actual completion of the international search  
6 November 2003Date of mailing of the international search report  
09 DEC 2003

Name and mailing address of the ISA/AU

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Herzog, Herbert. Hypothalamic Y2 receptors: central coordination of energy homeostasis and bone mass regulation. Drug News Perspect, 2002. 15(8), 506-510 Whole document	1-74, 122-140 and 150.
Y	Togari A et al. Expression of mRNAs for neuropeptide receptors and $\beta$ -adrenergic receptors in human osteoblasts and human osteogenic sarcoma cells. Neurosci Letts, 1997. 225:125-8 Whole document	1-74, 122-140 and 150.
X	Cabrele C et al. Molecular characterisation of the ligand-receptor interaction of the neuropeptide Y family. J Peptide Sci, 2000. 6: 97-122	75-105
Y	Whole document	1-74, 122-140 and 150.
X	Parker E et al. Neuropeptide Y receptors as targets for anti-obesity drug development: perspective and current status. Eur J Pharmacol, 2002. 440: 173-187 Whole document	75-105
X	US 5968819 A (GERALD Christophe PG et al) October 19.1999. Particularly columns 4-8, SEQ IDs	75-105,
Y		122-125, 127, 128
X	Kushi A et al. Obesity and mild hyperinsulinaemia found in neuropeptide Y-Y1 receptor deficient mice. Proc Nat Acad Sci USA, 1998. 95:15659-64.	75-105,
Y	Whole document	122-128
X	Iyengar S et al. Characterization of neuropeptide Y induced feeding in mice: do Y1-Y6 receptor subtypes mediate feeding? J Pharmacol Exp Ther, 1999 Whole document.	75-105
X	Duhault J et al. Food intake in rodents: Y5 or Y1 NPY receptors or both? Can J Physiol Pharmacol, 2000. 78: 173-185 Whole document	74-100, 103-105
X	Chamorro S et al. Appetite suppression based on selective inhibition of NPY receptors. Int J Obes, 2002. 26: 281-298 Whole document	75-105
X	Sainsbury A et al. Important role of hypothalamic Y2 receptors in body weight regulation revealed in conditional knockout mice. Proc Nat Acad Sci USA, 2002. 99(13): 8938-8943. Whole document	75-100, 102-105
X	Block MH et al. Discovery and optimization of a series of carbazole ureas as NPY5 antagonists for the treatment of obesity. J Med Chem, 2002. 45: 3509-3523. Whole document	75-100, 103-105
X	Tang-Christensen M et al. Central administration of Y5 antisense decreases spontaneous food intake and attenuates feeding in response to exogenous neuropeptide Y. J Endocrinol, 1998. 159: 307-312 Whole document	75-100, 103-105

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International application No.

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C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Hansel DE et al. Neuropeptide Y functions as a neuroproliferative factor. Nature, (2001 Apr 19) 410 (6831) 940-4. Whole document	106-121
Y	WO 00/00606 A1(GARVAN INSTITUTE OF MEDICAL RESEARCH) 6 January 2000	1-22, 24-34, 37-69, 72-101, 103-105, 122- 125, 127-129, 131-138, 150

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**Box I** Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos :  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos :  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos :  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

**Box II** Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The ISA has identified four separate inventions. See Supplemental Box II for details

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☒ The additional search fees were accompanied by the applicant's protest.☐ No protest accompanied the payment of additional search fees.

**Supplemental Box**

(To be used when the space in any of Boxes I to VIII is not sufficient)

**Continuation of Box No: II, Unity of Invention**

The first invention, defined by claims 1-74, 128/2-134 and 147 is directed to methods of determining modulators of neuropeptide Y receptors associated with bone remodelling.

The second invention, defined by claims 75-105, 135-is directed to methods of determining modulators of neuropeptide Y receptors associated with adiposity or obesity.

The third invention, defined by claims 106-121 and 136-146-is directed to methods of determining modulators of neuropeptide Y receptors associated with differentiation of stem cells, progenitor cells or precursor cells into adipocytes or osteoblasts.

The fourth invention, defined by claims 122-127/1 is to transgenic animals with modified neuropeptide Y receptor(s).

The only feature common to all inventions is modulation of neuropeptide Y receptor activity, either by agonists or antagonists in inventions 1-3, or by genetic alteration in invention 4.

Antagonism of neuropeptide Y receptors is well known in the art. Therefore modulation of neuropeptide Y activity cannot serve as a special technical feature to unite the invention, as required by Rule 13.2 of the PCT. Thus there is no special technical feature that unites the four different inventions.

The ISA has determined not to ask for extra fees on the fourth invention, as it can be searched in association with any one of the other inventions without undue effort.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/AU03/01227**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Member
WO 01/53477	AU 32900/01 A
WO 00/00606	AU 45914/99 CA 2331328 EP 1092021 JP 200251902026T
US 5968819	AU 32952/97 CA 2174529 EP 1007073 JP 1051079T WO 96/96/16542
END OF ANNEXE	